

# **EXHIBIT 6**

## UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS

**U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)**

### **Claim 1**

UMBRA Technologies Ltd. (“UMBRA”) provides evidence of infringement of claim 1 of U.S. Patent No. 10,630,505 (hereinafter “the ’505 patent”) by VMware Inc. (“VMware”). In support thereof, UMBRA provides the following claim charts.

“Accused Instrumentalities” as used herein refers to at least VMware systems and methods, including one or more hardware and software products for network virtualization and related services, which by way of example include but are not limited to VMware SD-WAN, (*see, e.g.*, VMware SD-WAN, <https://www.vmware.com/products/sd-wan.html>), VMware NSX software-defined data center (*see, e.g.*, VMware NSX, <https://www.vmware.com/products/nsx.html>), VMware vSphere (*see, e.g.*, VMware vSphere, <https://www.vmware.com/products/vsphere.html>), and VMware Horizon (*see, e.g.*, VMware Horizon, <https://www.vmware.com/products/horizon.html>) and related earlier versions (the “Accused Instrumentalities”). These claim charts demonstrate VMware’s infringement, and provide notice of such infringement, by comparing each element of the asserted claims to corresponding components, aspects, and/or features of the Accused Instrumentalities. These claim charts are not intended to constitute an expert report on infringement. These claim charts include information provided by way of example, and not by way of limitation.

The analysis set forth below is based only upon information from publicly available resources regarding the Accused Instrumentalities, as VMware has not yet provided any non-public information. An analysis of VMware’s (or other third parties’) technical documentation and/or software source code may assist in fully identifying all infringing features and functionality. Accordingly, UMBRA reserves the right to supplement this infringement analysis once such information is made available to UMBRA. Furthermore, UMBRA reserves the right to revise this infringement analysis, as appropriate, upon issuance of a court order construing any terms recited in the asserted claims. UMBRA provides this evidence of infringement and related analysis without the benefit of claim construction or expert reports or discovery. UMBRA reserves the right to supplement, amend or otherwise modify this analysis and/or evidence based on any such claim construction or expert reports or discovery.

**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS**

**U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)**

**Claim 1**

Unless otherwise noted, UMBRA contends that VMware directly infringes the '505 patent in violation of 35 U.S.C. § 271(a) by selling, offering to sell, making, using, and/or importing the Accused Instrumentalities. The following exemplary analysis demonstrates that infringement. Unless otherwise noted, UMBRA further contends that the evidence below supports a finding of indirect infringement under 35 U.S.C. §§ 271(b) and/or (c), in conjunction with other evidence of liability under one or more of those subsections. VMware makes, uses, sells, imports, or offers for sale in the United States, or has made, used, sold, imported, or offered for sale in the past, without authority, or induces others to make, use, sell, import, or offer for sale in the United States, or has induced others to make, use, sell, import, or offer for sale in the past, without authority products, equipment, or services that infringe claim 1 of the '505 patent, including without limitation, the Accused Instrumentalities.

Unless otherwise noted, UMBRA believes and contends that each element of each claim asserted herein is literally met through VMware's provision of the Accused Instrumentalities. However, to the extent that VMware attempts to allege that any asserted claim element is not literally met, UMBRA believes and contends that such elements are met under the doctrine of equivalents. More specifically, in its investigation and analysis of the Accused Instrumentalities, UMBRA did not identify any substantial differences between the elements of the patent claims and the corresponding features of the Accused Instrumentalities, as set forth herein. In each instance, the identified feature of the Accused Instrumentalities performs at least substantially the same function in substantially the same way to achieve substantially the same result as the corresponding claim element.

To the extent the chart of an asserted claim relies on evidence about certain specifically identified Accused Instrumentalities, UMBRA asserts that, on information and belief, any similarly functioning instrumentalities also infringes the charted claim. UMBRA reserves the right to amend this infringement analysis based on other products made, used, sold, imported, or offered for sale by VMware. UMBRA also reserves the right to amend this infringement analysis by citing other claims of the '505 patent, not listed in the claim chart, that are infringed by the Accused Instrumentalities. UMBRA further reserves the right to amend this infringement analysis by adding, subtracting, or otherwise modifying content in the “Accused Instrumentalities” column of each chart.

**UMBRA TECHNOLOGIES LTD.’S FIRST INFRINGEMENT ANALYSIS****U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)****Claim 1**

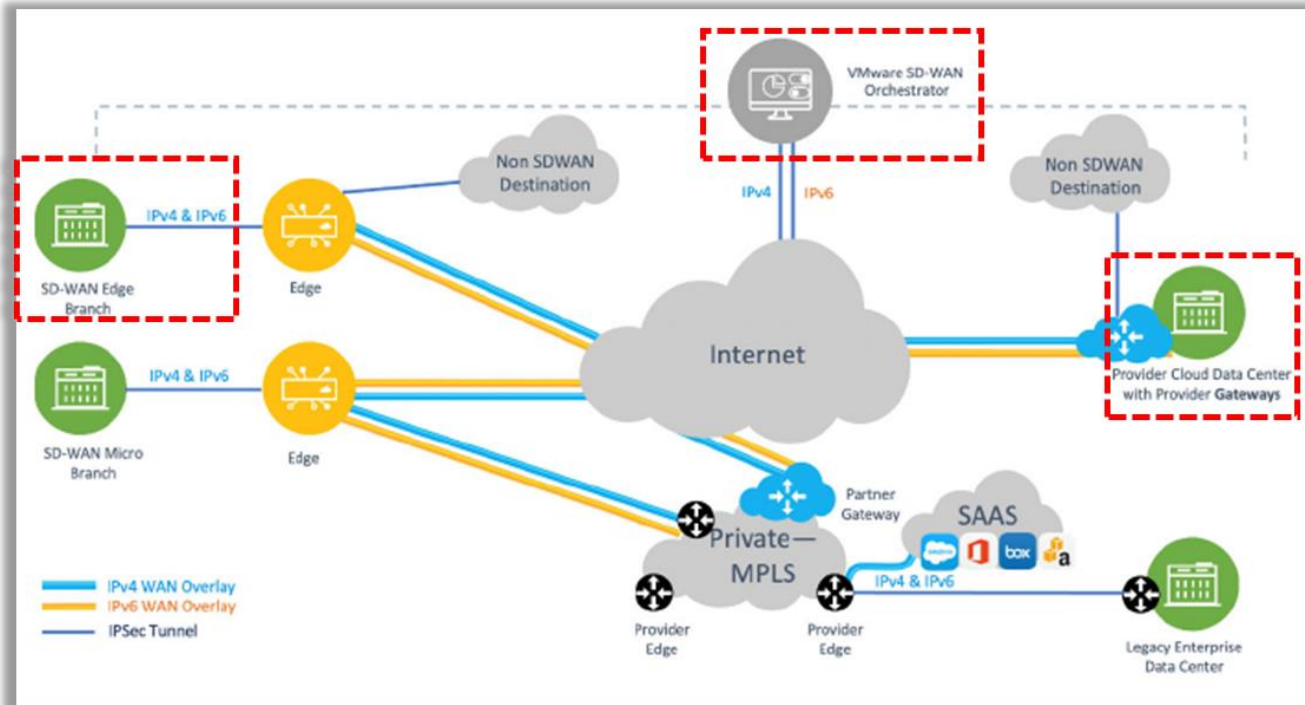
Claim #1	Accused Instrumentalities
<p>Indep. Cl. 1 1-p</p> <p>1. A network system comprising:</p>	<p>A network system corresponds with the VMware software-defined wide area network (SD-WAN).</p> <p>Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.14-17, <a href="https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf">https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf</a> (annotations added)</p> <p>“VMware SD-WAN is a cloud network service solution enabling sites to quickly deploy Enterprise grade access to legacy and cloud applications over both private networks and Internet broadband.” <i>Id.</i> p. 14</p> <p>“VMware SD-WAN routing uses three components: Edge, Gateway, and Orchestrator.” <i>Id.</i> p. 16</p> <p>“The SD-WAN Edge is an enterprise-class device or virtualized cloud instance that provides secure and optimized connectivity to private, public and hybrid applications, and virtualized services.” <i>Id.</i> p. 16</p> <p>“The SD-WAN Gateway is autonomous, stateless, horizontally scalable, and cloud-delivered to which Edges from multiple tenants can connect.” <i>Id.</i> p. 16</p> <p>“The SASE Orchestrator is a multi-tenant cloud-based configuration and monitoring portal. In SD-WAN routing the Orchestrator manages routes for all enterprises and can override default routing behavior.” <i>Id.</i> p. 17</p>

## UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS

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### Claim 1

1-p  
Cont.



*Id.* p. 16 of 710 in the above noted PDF.

**UMBRA TECHNOLOGIES LTD.’S FIRST INFRINGEMENT ANALYSIS**

**U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)**

**Claim 1**

1-p  
Cont.

■ The **SD-WAN Edge** is an enterprise-class device or virtualized cloud instance that provides secure and optimized connectivity to private, public and hybrid applications, and virtualized services. In SD-WAN routing the Edge is a **Border Gateway**. An Edge can function as a regular Edge (with no Hub configuration), as a Hub by itself or as part of a cluster, or as a Spoke (when Hubs are configured).

■ The **SD-WAN Gateway** is autonomous, stateless, horizontally scalable, and cloud-delivered to which Edges from multiple tenants can connect. For any SD-WAN deployment, several SD-WAN Gateways are deployed as a geographically distributed (for lower latency) and horizontally scalable (for capacity) network with each Gateway acting as a **Route Reflector** for their connected Edges.

All routes that are locally learned on an Edge are sent to the Gateway based on the configuration. The Gateway then reflects these routes to other Edges in the enterprise, allowing for efficient full mesh VPN connectivity without building a full mesh of tunnels.

■ The **SASE Orchestrator** is a multi-tenant cloud-based configuration and monitoring portal. In SD-WAN routing the Orchestrator manages routes for all enterprises and can override default routing behavior.

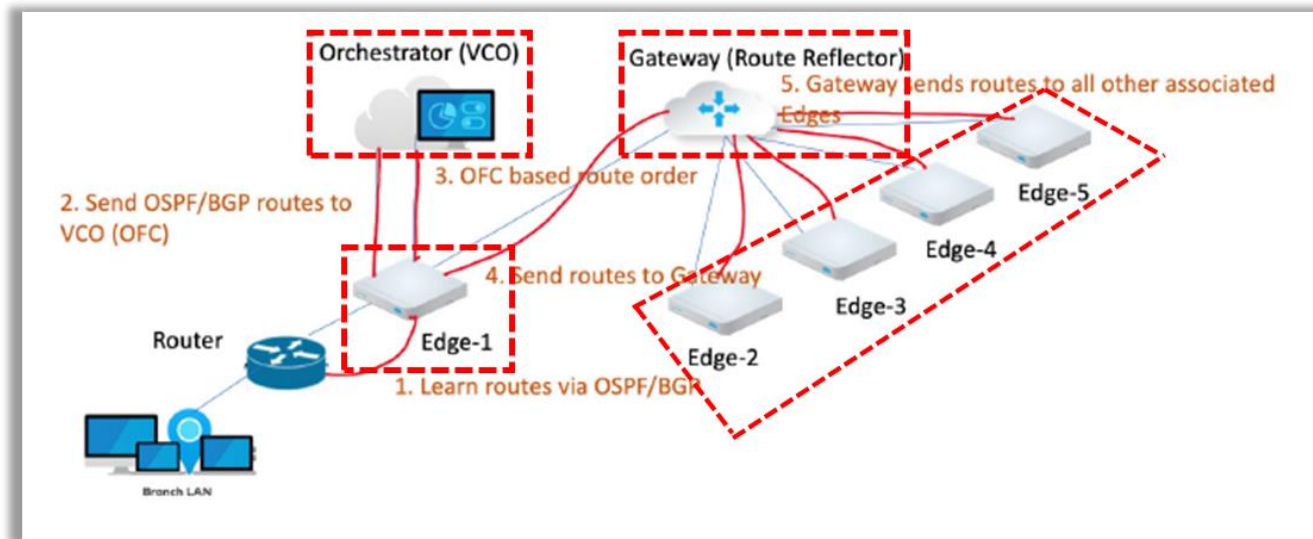
*Id.* pp. 16-17 of 710 in the above noted PDF.

**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS**

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**Claim 1**

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Cont.



*Id.* p. 17 of 710 in the above noted PDF.



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## Claim 1

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Cont.

See also: <https://sase.vmware.com/content/dam/digitalmarketing/vmware-sase/pdfs/sdwan-991-Case-for-VMware-SASE-wp-0921.pdf> **Image Clipped from PDF file:** sdwan-991-Case-for-VMware-SASE-wp-0921.pdf - on page 8 ( middle right )

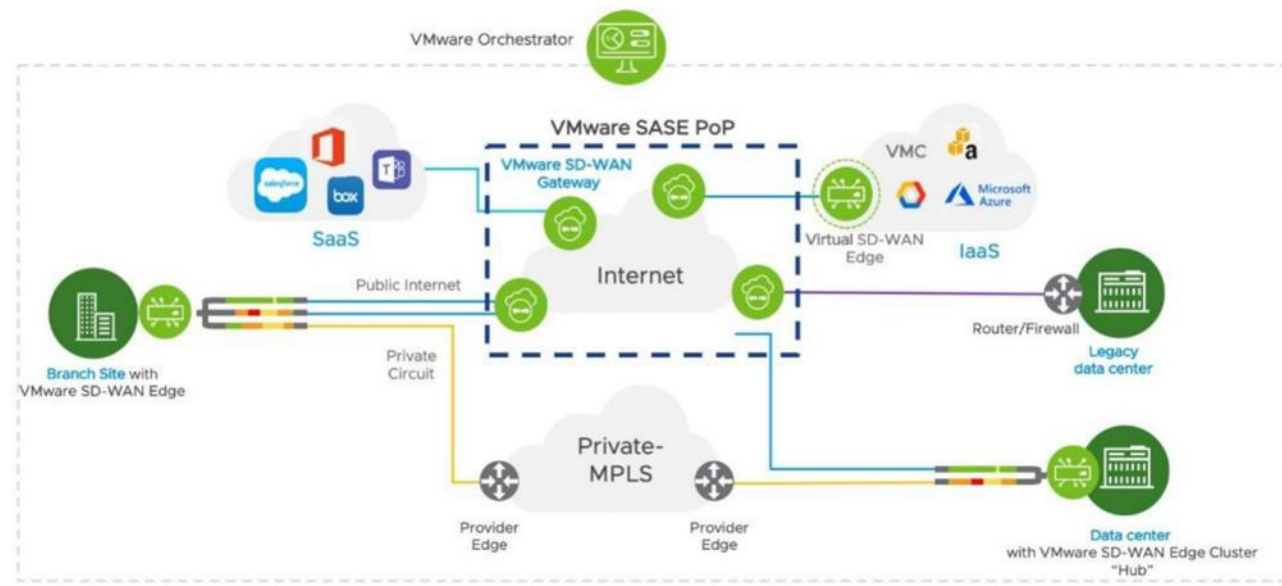


Figure 4: VMware SD-WAN component: SD-WAN Gateway



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## Claim 1

<p>1-a</p> <p>a first device;</p> <p>a second device;</p> <p>and</p>	<p>A first device and/or second device correspond with VMware Edge devices in the VMware SD-WAN.</p> <p>Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.14-17, et seq.  <a href="https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf">https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf</a>  (annotations added)</p> <p>SD-WAN Edge devices provide connectivity to private, public and hybrid applications, e.g., “Edge-1”, “Edge-3.” <i>Id.</i> p. 16, 26</p> <p>SD-WAN Edge devices can function as a regular Edge device, as a Hub or as part of a cluster or as a Spoke. <i>Id.</i> p. 23</p> <div> <p>The diagram illustrates the VMware SD-WAN architecture. It shows a Branch LAN connected to a Router, which is connected to Edge-1. Edge-1 is connected to a Gateway (Route Reflector). The Gateway is connected to other Edge devices (Edge-2, Edge-3, Edge-4, Edge-5) and an Orchestrator (VCO). The diagram includes the following steps:</p> <ol style="list-style-type: none"> <li>1. Learn routes via OSPF/BGP</li> <li>2. Send OSPF/BGP routes to VCO (OFC)</li> <li>3. OFC based route order</li> <li>4. Send routes to Gateway</li> <li>5. Gateway sends routes to all other associated Edges</li> </ol> </div> <p><i>Id.</i> p. 17 of 710 in the above noted PDF.</p>
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## UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS

U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)

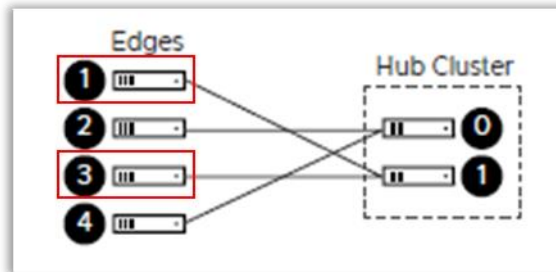
### Claim 1

1-a  
Cont.

The SD-WAN Edge is an enterprise-class device or virtualized cloud instance that provides secure and optimized connectivity to private, public and hybrid applications, and virtualized services. In SD-WAN routing the Edge is a **Border Gateway**. An Edge can function as a regular Edge (with no Hub configuration), as a Hub by itself or as part of a cluster, or as a Spoke (when Hubs are configured).

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, p.16, 26  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>  
(annotations added)  
See also, p. 134

In an SD-WAN architecture, two devices are edges connected through a hub (intermediate access point server) through tunnels established over communications links between peers.



Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, p.136,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>  
(annotations added)

**UMBRA TECHNOLOGIES LTD.’S FIRST INFRINGEMENT ANALYSIS****U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)****Claim 1**1-a  
Cont.

“In a traditional Hub and Spoke topology, the SD-WAN Orchestrator provides the Edge with the logical ID of the Hub to which it must be connected. The Edge asks its assigned Gateways for connectivity information for that Hub logical ID—i.e. IP addresses and ports, which the Edge will use to connect to that Hub.

From the Edge’s perspective, this behavior is identical when connecting to a Cluster. The Orchestrator informs the Edge that the logical ID of the Hub it should connect to is the Cluster logical ID rather than the individual Hub logical ID. The Edge follows the same procedure of sending a Hub connection request to the Gateways and expects connectivity information in response”

*Id.* p. 136

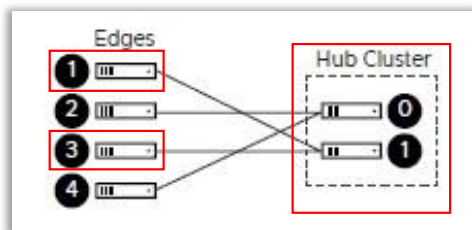
A tunnel is established over a link and has communication with a peer. A peer can be a Gateway (edge to Cloud traffic), Hub (edge to data center traffic) or Edge (dynamic edge-to-edge VPN traffic). The Tunnel Stats template captures the stats of a tunnel and it is sent every one minute. The linkUUID field lists the link established for the tunnel. The interfaceIndex field says to which peer it is communicating.

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, p.217,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>

**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS****U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)****Claim 1**

1-b  
a plurality of intermediate access point servers that form a plurality of end-to-end tunnels connecting the first device and the second device; and

Hubs in a Hub Cluster, correspond with a plurality of intermediate access point servers, establishing a plurality of end-to-end tunnels connecting multiple edge devices.



Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, p.136,

<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf> (annotations added)

- The path calculation with multiple DSCP labels per Flow is not applicable for the SD-WAN Gateways. You can enable this option only for Edge-to-Edge tunnels, where Edge-to-Edge can be any of the following:
  - Edge-to-Edge through Hub
  - Spoke-to-Hub
  - Dynamic Branch-to-Branch

Source: VMware SD-WAN Operator Guide VMware SD-WAN 5.0, p.60, <https://docs.vmware.com/en/VMware-SD-WAN/5.0/vmware-sd-wan-operator-guide.pdf> (annotations added)

A tunnel is established over a link and has communication with a peer. A peer can be a Gateway (edge to Cloud traffic), Hub (edge to data center traffic) or Edge (dynamic edge-to-edge VPN traffic). The Tunnel Stats template captures the stats of a tunnel and it is sent every one minute. The linkUUID field lists the link established for the tunnel. The interfaceIndex field says to which peer it is communicating.

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, p.217,

<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>

**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS****U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)****Claim 1**1-b  
Cont.

See also: <https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/products/vmw-practical-path-zero-trust-data-center.pdf> **Image Clipped from PDF file:** vmw-practical-path-zero-trust-data-center.pdf - on page 6 ( bottom right )

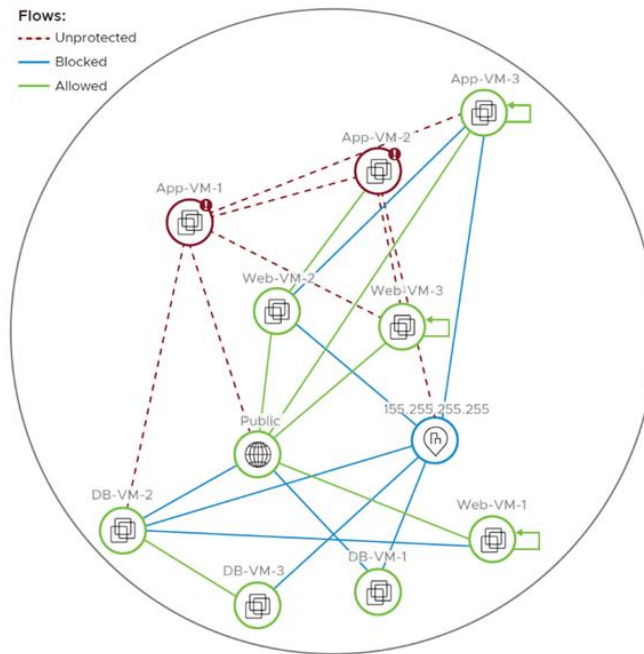


Figure 3: Network topology visibility

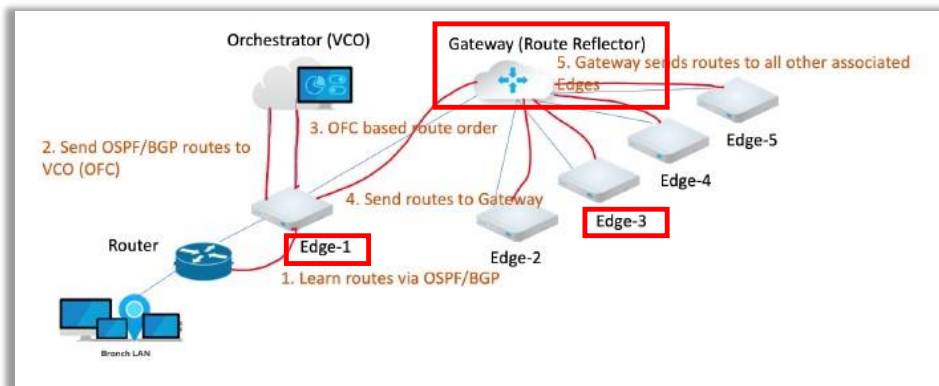
**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS****U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)****Claim 1**

1-c

a control server,

wherein the control server receives information from at least one of the plurality of intermediate access point servers, and

The SD-WAN gateway and/or the Orchestrator (either each alone or in combination) are configured to operate as an SD-WAN controller or “control server”. Usage statistics are delivered through the hub cluster, and the hub cluster forwards the information to the control server.



Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, p.17,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf> (annotations added)

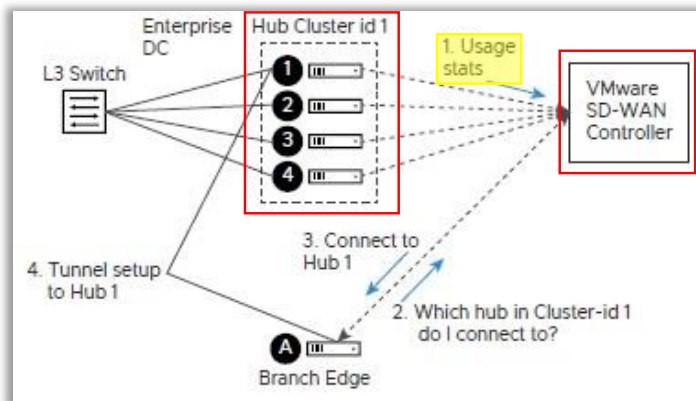
# UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS

U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)

## Claim 1

1-c  
Cont.

wherein the control server selects one of the plurality of end-to-end tunnels for communication between the first and second devices based on the information.



Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.135, <https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf> (annotations added)

There are multiple use cases which require the SD-WAN Gateway to operate as a Controller only (that is, to remove the data plane capabilities). Additionally, this will enable the Gateway to

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.305, <https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf> (annotations added)

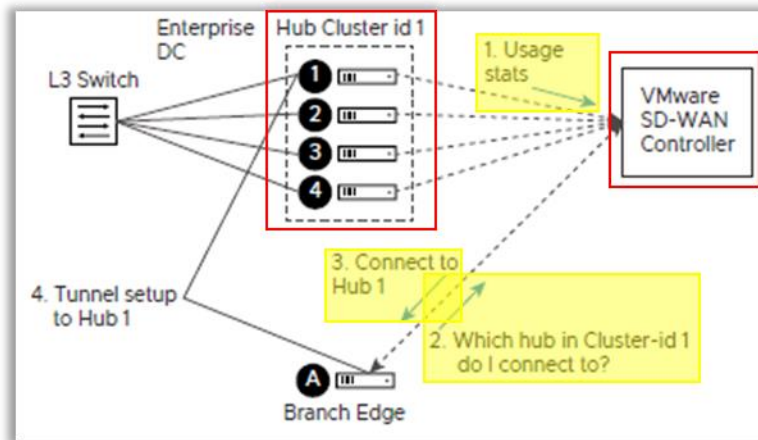


**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS****U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)****Claim 1**1-c  
Cont.

Each Edge in a cluster periodically reports usage and load stats to the SD-WAN Gateway. The load value is calculated based on Edge CPU and memory utilization along with the number of tunnels connected to the Hub as a percentage of the Edge model's tunnel capacity. The Hubs within the cluster do not directly communicate nor exchange state information. Typically, Edge Clusters are deployed as Hubs in data centers.

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.132,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>  
 (annotations added)

The SD-WAN controller decides which hub node to use based on usage and link related information.



Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.135,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>  
 (annotations added)

**UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS**

**U.S. Patent No. 10,630,505 – Defendant VMware Inc. - UMBRA Technologies Ltd. (“UMBRA”)**

**Claim 1**

1-c  
Cont.

Each Edge in a cluster periodically reports usage and load stats to the SD-WAN Gateway. The load value is calculated based on Edge CPU and memory utilization along with the number of tunnels connected to the Hub as a percentage of the Edge model's tunnel capacity. The Hubs within the cluster do not directly communicate nor exchange state information. Typically, Edge Clusters are deployed as Hubs in data centers.

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.132,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>  
(annotations added)

As is the nature of a distributed control plane, each Gateway is making an individual determination of the Cluster assignment. In most cases, Gateways will use the same mathematical formula and thus arrive at the same assignment for all Edges. However, in cases like Cluster Score-based rebalancing this cannot be assured.

If an Edge is not currently connected to a Hub in a Cluster, it will accept the assignment from any Gateway that responds. This ensures that Edges are never left unassigned in a scenario where some Gateways are down and others are up.

Source: VMware SD-WAN Administration Guide - VMware SD-WAN 4.2, pp.137,  
<https://docs.vmware.com/en/VMware-SD-WAN/4.2/VMware-SD-WAN-Administration-Guide.pdf>  
(annotations added)

## UMBRA TECHNOLOGIES LTD.'S FIRST INFRINGEMENT ANALYSIS

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### Claim 1

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Cont.

See also:

<https://blogs.vmware.com/performance/2023/06/ocvs-perf.html>

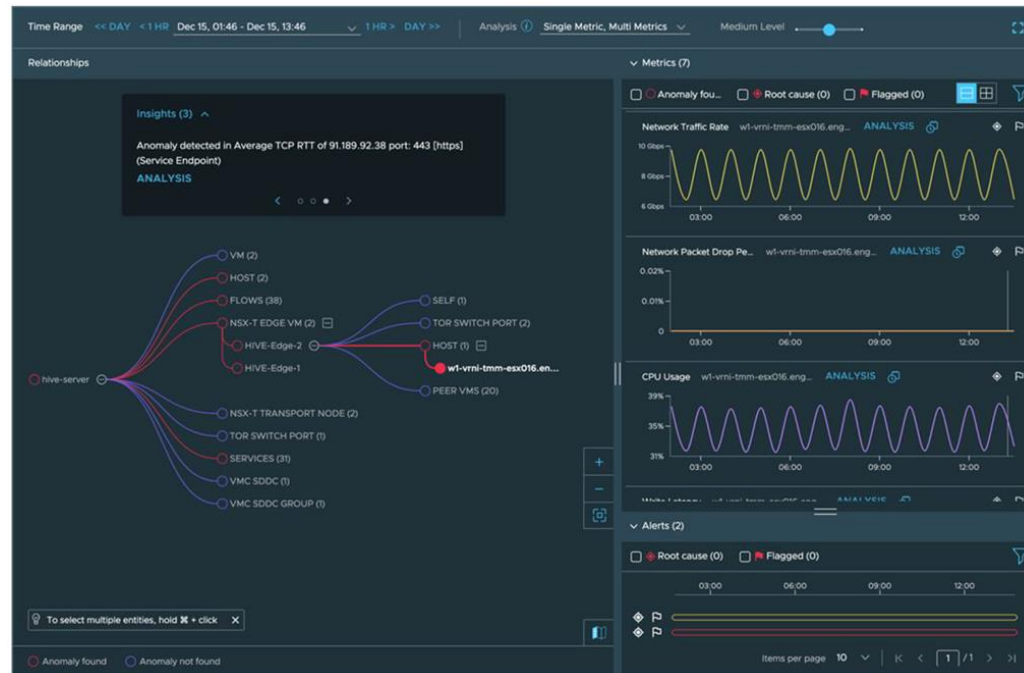


Figure 16. Troubleshoot latency using Guided Network Troubleshooting with VMware Aria Operations for Networks, see PDF p. 8.

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**Claim 1**

**Caveat:** The notes and/or cited excerpts utilized herein are set forth for illustrative purposes only and are not meant to be limiting in any manner. For example, the notes and/or cited excerpts, may or may not be supplemented or substituted with different excerpt(s) of the relevant reference(s), as appropriate. Further, to the extent any error(s) and/or omission(s) exist herein, all rights are reserved to correct the same.